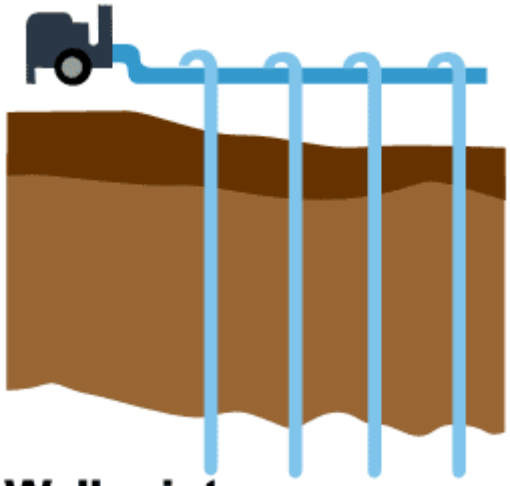
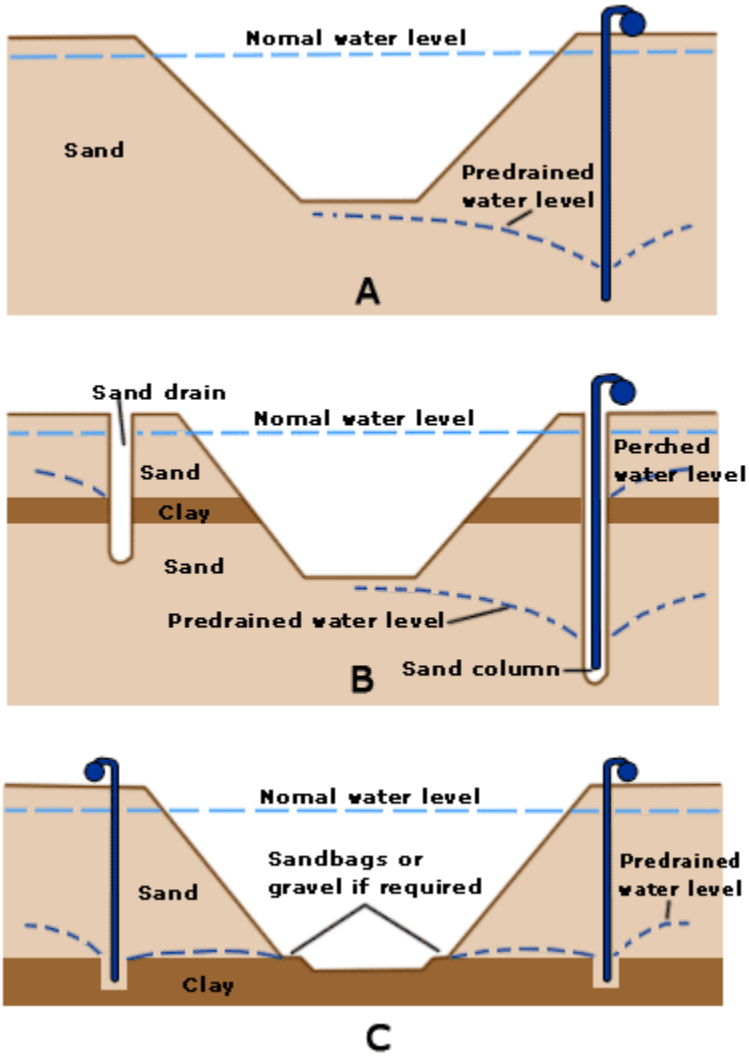
Well point Systems

A well point system consists of a number of well points spaced along a trench or around an excavation site, all connected to a common header which is attached to one or more well point pumps. Well point assemblies-made up of a well point, screen, riser pipe, and swing joint with tuning-are generally installed by jetting. They provide for entry of water into the system by creation of a partial vacuum. The water is then pumped off through the header pipe. A well point pump is a combination of two pumps, one of which pumps water from the header and the other of which is a vacuum pump to remove air which enters the system. Control of air is important, as excessive air causes cavitation which reduces pump efficiency. The dewatering pumps used are normally designed specifically for the dewatering function. They are available in sizes from 4" to 10" with handling capacity up to 500m3/hour.

Well point systems are frequently the logical and economic choice for dewatering construction sites where the required lowering of ground water level is on the order of 6 meters or less. Greater lifts are possible by lowering the water in two or more stages. The 6 meter lift restriction results from the fact that the water is lifted by difference between ambient air pressure and the lowered pressure created by the pump.
Well point systems are practical and effective under most soil and hydrologic conditions. Among the instances where other dewatering techniques are preferable are where water levels must be lowered greater distance than can be practically handled by the well point systems, where greater quantities of water must be moved than is practical with well points, or where the close spacing of well points and the existence of the above-ground header might physically interfere with construction operations.
In a typical system, well points are spaced at intervals of from 1 to 3 meters. The depth to which a well point is sunk into the ground is largely determined by the nature of the subsurface soil. The size and number of pumps, the number and type of well points, the diameter of risers and headers, the number and location of valves etc. would only be determined after a thorough study of the hydro geological conditions at a particular site have been completed.





Dewatering with well points.

(a) Uniform soil can be dewatered with well points on one side.
(b) A clay layer above sub grade may require sand drains on opposite side to handle perched water.
(c) Clay at and below sub grade may require well points on both sides of trench.

This is a brief explanation on well point systems and should further information be required please don't hesitate to contact Wellcore.

Eductors Well Systems

In a typical eductor well system a series of wells are installed with a spacing related to the soil condition. The wells are equipped with a feed pipe, a venturi ejector and a return pipe. At the head of the well, the feed pipe is connected to a high pressure feed line and the return pipe is connected to a low pressure evacuation line. The two lines are connected to a special pumping plant which supply the feed line with high pressure water and collect and evacuate the water from the evacuation line. The high pressure water going through the venturi will draw the ground water through the well screen and push it up to the surface through the return pipe. This system can lower the water table to approximately 30 meters in conditions where the permeability of soil is low. Generally this system is not used in South Africa.

Installation

Despite higher installation cost, wells are being used more and more because they often prove more economical to operate than well points. Wells can be installed at ground surface outside the construction area and will lower water in a single lift without staging. Units are spaced from 6 to 60 meters on centers. Each unit comprises a well, pump, and discharge piping. An ejector are installed at relatively close spacing similar to the array in well point systems, but requires only a single stage to effect draw down of up to 30 meters. However, because the ejector system is very power inefficient, its use generally is limited to soil of low permeability.

This is a brief explanation on ejector well systems and should further information be required please don't hesitate to contact Wellcore.

Deep well systems

Deep well systems consist of one or more individual wells, each of which has its own submersible pump at the bottom of the well (Boreholes). Such systems are particularly suitable where large volumes of water must be pumped in highly permeable sand and

gravel which permit a rapid recharging of ground water from surrounding areas, where the depth of excavation below the water table exceeds the lift capabilities of other dewatering techniques or where above ground apparatus might interfere with construction operations. Normally, individual wells are spaced at distances of as much as 15 meters. But soil conditions and the dewatering plan can cause spacing as close as just a few meters. Deep well pumps can lift water 30 meters or more in a single stage. A variation of the typical deep well system is a pressure within an aquifer. Such wells require no pump, the water being forced to the surface by its own pressure. However, a vacuum pump is frequently used to boost flow. Such wells are often sealed to prevent intake of air or water from higher aquifers. Deep wells are very expensive to install and maintain, but in many applications they can be the most economical choice. A typical deep well consists of a drilled hole within which is a lower screened casing which admits water to the pump; an upper casing which prevents soil from reaching the pump and, within the casing, the pump and its discharge pipe. The discharge pipe supports the pump to which it is attached. Electrical wiring for the pump motor runs between the discharge pipe and the casing. The space between the drilled hole and the casing is normally packed with filter material (coarse sand and/or gravel, for example) to minimize the pumping of solid material from the soil surrounding the well. Generally this system would be used at sea level and the mining industry in South Africa.

Installation

Despite their installation cost, in some cases deep wells are indicated because of their efficiency and of their low operation cost compared to multistage well points. The deep wells can be installed from the surface around the construction area. They will lower the water table to 30 m or more in one single stage, with spacing from 6 to 30 meters. depending on the soil condition. One well comprises the well itself and its casing, the well screen, the sand filter when needed, the pump and the discharging piping. The diameter of the well and the spacing will be determined from soil study and excavation depth according to the volume of water to be removed to achieve a dry and stable excavation bottom.

This is a brief explanation on deep well systems and should further information be required, please don’t hesitate to contact Wellcore.